the supra-renal, thymus and thyroid bodies, and the correctness of which, with certain modifications, he has been enabled to confirm by subsequent observation and reflection. His hypothesis was that the three organs in question are the remains of the blastoderma; the thyroid being the developement of a portion of the original cellular substance of the germinal membrane grouped around the two branches of the omphalo-mesenteric vein; the supra-renal capsules, the developements of other portions grouped around the omphalo-mesenteric arteries; and the thymus, the developement of the intermediate portion of the membrane arranged along the sides of the embryonic visceral cavity. He has since ascertained, however, that the thyroid body derives its origin in a portion of the included *membrana intermedia* remaining in connexion with anastomosing vessels between the first and second aortic arches, or carotid and subclavian vessels. He considers these organs as essentially similar in their structure, as well as in their origin in continuous portions of the blastoderma situated along each side of the spine, and extending from the Wolfian bodies to the base of the cranium: the developement of the supra-renal capsules having relation to the omphalo-mesenteric vessels; the thymus, to the jugular and cardinal veins and ductus Cuvieri; and the thyroid gland, to the anastomosing branches of the first and second aortic arches. The functions of these organs he regards as being analogous to those of the blastoderma; with this difference, however, that as the blastoderma not only elaborates nourishment for the embryo, but absorbs it also from without, that is, from the yolk, the developed organs only elaborate the matter which has already been absorbed by the other parts, and is now circulating in the vessels of the more perfect individual.

January 29, 1846.

GEORGE RENNIE, Esq., Treasurer and V.P., in the Chair.

William Addison, Esq., and George Buist, Esq., were elected Fellows of the Society.

"On the Use of the Barometric Thermometer for the determination of Relative Heights." By James R. Christie, Esq. Communicated by S. Hunter Christie, Esq., Sec. R.S., &c.

The objects of this communication, as stated by the author, are, first, to show the theoretical foundation of the very simple law pointed out by Professor Forbes, according to which the difference of the boiling temperature of water at two stations is connected with their difference of level; and next, to test the accuracy of this law by a comparison of results deduced from his own observations on the boiling-point of water at different stations among the Alps of Savoy, Piedmont and Switzerland, with the heights of the same stations as determined by other observers and by different means; and thus to

arrive at a just conclusion with respect to the value of the barometric thermometer as an instrument for determining differences of level.

Combining DeLuc's formula reduced to English units,

$$b = \frac{99}{\cdot 899} \log 10\beta - 60\cdot 804,$$

where b is the variable boiling-point on Fahrenheit's scale and β the corresponding barometric pressure, with the formula of Laplace for the determination of the difference in level of two stations from barometric observations, he obtains the formula

$$H = 547\cdot 99\ (b - b')\ \left\{1 + (t - 32^\circ)\ \cdot 00222\right\},$$

where b and b' are the boiling-points on Fahrenheit's scale at the two stations, t the mean temperature of the air at the stations, and H their difference of level in English feet.

The author describes the particular instrument he employed in his observations, and his mode of determining the correction which it required: he then gives, in a table, the observations he made on the boiling-point of water at thirty-eight different stations in the Alps, the heights of the corresponding stations above the sea level, deduced from these observations, and, for the purpose of comparison, the heights of the same stations deduced by other observers. The difference between these and some of the author's results are considerable; but as they are not greater than would probably arise from ordinary barometric measurements, and as there is a close accordance between his results and the determinations on which the greatest reliance can be placed, he concludes that the results are on the whole satisfactory. Considering it, however, desirable to obtain some test of the accuracy of each observation independently of the rest of the series, the author avails himself of the barometric observations made at the Observatory at Geneva and at the Convent of the Great St. Bernard; and determining from these the corresponding temperature of boiling water, deduces the difference of level between each of his stations and these two places considered as fixed points: the sum of the height above Geneva and the depression below the Great St. Bernard should in all cases be the difference of level between the two fixed stations. Although there are here again considerable discrepancies, yet in most cases where the height of the station may be considered as well-established, the height deduced from the observations agrees with it in a very remarkable manner.

In another table, the author gives the difference of level between the Observatory at Geneva and the Great St. Bernard, deduced from the recorded observations at those places simultaneous with his own at his various stations; and then remarks that the differences of height determined by the two methods do not differ from one another, in any single case, by so large a quantity as do the greatest and least differences of height deduced from the barometric observations; while in many cases the accordance is almost perfect.

The conclusion drawn from the comparisons in these tables is, that the barometric thermometer is capable of affording highly ac-

curate and satisfactory results, perhaps even more so than the common form of barometer, but that there is considerable uncertainty attached to its indications. This uncertainty, far from being wholly attributable to the imperfections of the instrument as a measure of the atmospheric pressure, might, the author thinks, arise from an extreme susceptibility to rapid changes in that pressure, which remain unindicated by the more sluggish barometer.

"On the Decomposition and Analysis of the Compounds of Ammonia and Cyanogen." By Robert Smith, Esq., Ph. D. Communicated by Captain William Henry Smyth, R.N., F.R.S.

This paper is divided into four parts; the first relates to the decomposition of ammonia and its compounds by the compounds of chlorine, and the collection and measurement of the nitrogen gas which is disengaged, the amount of which the author considers as furnishing a ready and accurate mode of estimating the quantity of ammonia in the solution subjected to analysis. The chloride of lime was the salt usually employed for this purpose: this method is regarded by the author as being peculiarly applicable to the analysis of organic substances.

The second part treats of the decomposition and estimation of hydrocyanic acid and its compounds by means of chloride of lime, yielding nitrogen gas and carbonate of lime; a process which occupies but a few seconds. In some cases, the employment of chloride of soda is preferable to that of chloride of lime, on account of the solubility of all the compounds that are formed. The author found the same method applicable also to the analysis of the salts of cyanogen; for the cyanides of the alkalies are decomposed by it as rapidly as the pure acid itself. The ferro-cyanides are also very readily decomposed.

The author, in the third part of his paper, relates the results of his trials of the hypochlorites as agents for the decomposition of uric acid, which proved so satisfactory as to induce him to believe that these salts might be advantageously used as solvents of uric calculi in the living bladder. He also proposes the employment of chloride of lime as a ready and accurate mode of estimating the quantity of nitrogen contained in urine, from the amount of gas disengaged by its action on the nitrogenous compounds. In the last part, the apparatus used in the experiments is described.

"On a point connected with the dispute about the invention of Fluxions." By Augustus De Morgan, Esq., M.A., F.R.A.S., &c. Communicated by Samuel Hunter Christie, Esq., Sec. R.S., &c.

An assertion made by Sir Isaac Newton in a letter to Conti, published in Raphson's History of Fluxions, that the materials of the *Commercium Epistolicum* were "collected and published by a numerous Committee of gentlemen of *different nations*, appointed by the Royal Society for that purpose," appeared to be at variance with the list of the Committee as it was appointed on the 6th of March, 1711–12, and which only contains the names of Arbuthnot, Hill, Halley, Jones, Machin and Burnet, who were all English. But on